CLAIM(S)

1. A method of producing $Li_y[Ni_xCo_{1-2x}Mn_x]O_2$ wherein $0.025 \leq x \leq 0.45$, and $0.9 \leq y \leq 1.3$, the method comprising:

mixing $[Ni_xCo_{1-2x}Mn_x]OH_2$ with LiOH or Li_2CO_3 and one or both of alkali metal fluorides and boron compounds as sintering agent; and

heating the resulting mixture until a sufficiently dense composition of $Li_y[Ni_xCo_{1-2x}Mn_x]O_2$ is obtained for use in a lithium-ion battery.

2. The method of claim 1 wherein the resulting mixture is heated to at least about 900°C.

3. The method of claim 1 wherein the resulting mixture is heated for at least about 3 hours.

4. The method of claim 1 wherein the resulting mixture is heated for at least about 6 hours.

5. The method of claim 1 wherein the amount of sintering agent being mixed is about 0.1 to about 5.0 weight percent of the resulting mixture.

6. The method of claim 1 wherein the amount of sintering agent being mixed is in the range of about 0.2 to about 3.0 weight percent of the resulting mixture.

7. The method of claim 5 wherein the resulting mixture is heated for about 3 hours.

8. The method of claim 1 wherein the amount of sintering agent being mixed is less than about 10 weight percent of the resulting mixture.

9. The method of claim 1 characterized by the resulting densified composition exhibiting a reversible volumetric energy of at least about [1833 - 333x] measured in Wh/L, wherein $0.025 \leq x \leq 0.45$.

10. The method of claim 1 wherein the pellet density of the resulting densified composition is at least about 72 percent of theoretical density.

11. The method of claim 1 wherein the resulting densified composition has a pellet density in the range of about 3.3 to about 4.0 g/cm^3.

12. The method of claim 1 wherein said sintering agent is an alkali metal fluoride.

13. The method of claim 12 wherein said sintering agent is LiF.

14. The method of claim 1 wherein said sintering agent is a compound of boron.

15. The method of claim 14 wherein said sintering agent is selected from the group consisting of boron oxide, boric acid, and lithium borates.

16. A lithium transition metal oxide composition produced by the method of claim 1 and exhibiting a minimum reversible volumetric energy characterized by the formula [1833 - 333x] measured in Wh/L, wherein $0.025 \leq x \leq 0.45$.

17. A lithium transition metal oxide for use in a lithium-ion battery having the general formula of $Li_y[Ni_xCo_{1-2x}Mn_x]O_2$ wherein $0.025 \leq= x \leq 0.45$ and $0.9 \leq y \leq 1.3$ and exhibiting a minimum reversible volumetric energy characterized by the formula [1833 - 333x] measured in Wh/L.

18. The lithium transition metal oxide of claim 16 exhibiting a pellet density of at least about 72% of theoretical density.

19. The lithium transition metal oxide of claim 17 exhibiting a pellet density of at least about 72% of theoretical density.

20. The lithium transition metal oxide of claim 19 that is formed into a lithium ion battery electrode having a reversible volumetric energy in the range of about 1500 to about 2200 Wh/L.

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